

We claim:

1. Manufacturing process of cement (1) from a first raw mix (8) formed from a mixture (2) consisting of compounds CaCO_3 , Al_2O_3 and/or $\text{Al}(\text{OH})_3$, CaSO_4 , SiO_2 and/or a product containing silica or silicates such as clay, all these compounds being present in the anhydrous or hydrated form, individually or in combination, characterized in that the mixture (2) is treated up to clinkering by movement in the center (3) of kiln (4), in a sheet (5) with approximately constant thickness, at approximately constant speed, along a treatment path (6) subjected to a positive temperature gradient, and for a treatment time during which this mixture (2) remains below its melting temperature, and in that the clinkered mixture (7) forming a sulfoaluminate cement is cooled upon exit from the treatment path (6).

2. Manufacturing process of cement (1) according to Claim 1, characterized in that the mixture (2) contains, in addition, $\text{Al}_2(\text{SO}_4)_3$ in anhydrous or hydrated form.

3. Manufacturing process of cement (1) according to Claim 2, characterized in that $\text{Al}_2(\text{SO}_4)_3$ is added to the mixture (2) up to 10 wt%.

4. Manufacturing process of cement (1) according to any one of the preceding claims, characterized in that the mixture (2), in addition, contains at least one mineral phase high in at least one iron oxidation product for obtaining a second raw mix (9), said cement then forming ferroaluminate cement.

5. Manufacturing process of cement (1) according to any one of the preceding claims, characterized in that the mixture (2), in addition, contains a transition metal oxide chosen from Sc, Ti, V, Cr, Mn, Co, Ni, Cu, Zn, Y, Zr, Nb, Mo, Cd, La, Hf, Ta and W.

6. Manufacturing process of cement (1) according to Claim 5, characterized in that the mixture (2) contains up to 5-10 wt% of the transition metal oxide.

7. Manufacturing process of cement (1) according to any one of the preceding claims, characterized in that the mixture (2) is prepared by the steps of (i) mixing of each of its constituents with water to obtain a slurry (11), (ii) filtering said slurry (11) to obtain a pasty residue (12), (iii) transforming said pasty residue (12) with a view to its introduction into the center (3) of the kiln (4).

8. Manufacturing process of cement (1) according to Claim 7, characterized in that the pasty residue (12) is transformed by mixing, then by extrusion in plates or in strips (13) with approximately constant thickness.

9. Manufacturing process of cement (1) according to any one of the preceding
5 claims in combination with Claim 4, characterized in that the second raw mix (9) is deposited on an underlayer (15) of the first raw mix (8) before clinkering.

10. Manufacturing process of sulfoaluminate cement (1) according to any one of the preceding claims, characterized in that the movement of the mixture (2) in the center (3) of the kiln (4) is carried out on rollers (14).

10 11. Manufacturing process of cement (1) according to Claim 10, characterized in that at least the rollers (14) present in a clinkering zone (16) of the center (3) of the kiln (4) are made of silicon carbide.

12. Manufacturing process of cement (1) according to Claim 11, characterized in that at least the rollers (14) present in the clinkering zone (16) of the center (3) of the
15 kiln (4) are coated with silicon and/or MgO-ZrO_2 .

13. Manufacturing process of cement (1) according to Claim 10, characterized in that at least the rollers (14) present in clinkering zone (16) of the center (3) of the kiln (4) are coated with a refractory stainless steel with a melting point higher than 1400°C .

14. Manufacturing process of cement (1) according to Claim 13, characterized in
20 that the coating of refractory stainless steel consists of sleeves (24) mounted such that each can freely rotate around a roller (14).

15. Manufacturing process of cement (1) according to Claim 13 or 14, characterized in that the refractory stainless steel coating is an alloy with a high content of nickel of the Inconel® type.

25 16. Manufacturing process of cement (1) according to any one of the preceding claims, characterized in that the clinkering is carried out in the presence of oxygen.

17. Manufacturing process of cement (1) according to any one of the preceding claims, characterized in that the mixture (2) is subjected along the treatment path (6) successively to (I) possibly drying and/or dehydration, (II) decarbonation, and (III)
30 clinkering.

18. Manufacturing process of cement (1) according to any one of the preceding claims, characterized in that the clinkered mixture (7) is milled and mixed with limestone and/or gypsum and/or anhydrite and possibly heavy metals or oxidation compounds of heavy metals.

5 19. Cement (1) obtained by a process according to any one of the preceding claims.

20. Installation for manufacture of a cement (1) consisting of a tank (21) and a first mixer (22) for preparing a first raw mix (8) formed by a mixture (2) consisting of the compounds CaCO_3 , Al_2O_3 and/or $\text{Al}(\text{OH})_3$, CaSO_4 , SiO_2 and/or a
10 product containing silica or silicates such as clay, all these compounds being present in anhydrous or hydrated form, individually or in combination, characterized in that the installation consists of a kiln (4) and a kiln center (3) to treat the mixture (2) up to clinkering by movement in said kiln center (3) with a sheet (5) of approximately constant thickness, at approximately constant speed, along a treatment path (6) subjected
15 to a positive temperature gradient, and for a treatment time during which this mixture (2) remains below its melting temperature, and in that the installation consists of equipment for rapid cooling (23) of the clinkered mixture (7) upon exit from the treatment path (6).

21. Installation for manufacture of a cement (1) according to Claim 20, characterized in that it includes (i) a first mixer (22) associated with a tank (21) for
20 obtaining a slurry (11) during the combination of the mixture (2) with the water, (ii) a filter press (25) for filtration of said slurry (11) in order to obtain a pasty residue (12) and (iii) an extruder (27) for transforming said pasty residue (12), into plates or strips (13) with approximately constant thickness with a view to its introduction into the kiln (4).

22. Installation for manufacture of cement (1) according to Claim 21, characterized in that it includes a mixer (28) for homogenization of the pasty residue (12) prior to its introduction into the extruder (27).

23. Installation for manufacture of cement (1) according to any one of Claims 20-22, characterized in that the center (3) of the kiln (4) includes rollers (14) for
30 movement of the mixture (2).

24. Installation for manufacture of cement (1) according to any one of Claims 20-23, characterized in that it consists of means for adding at least one mineral phase high in at least one iron oxidation product for obtaining a second raw mix (9).

25. Installation for manufacture of cement (1) according to Claim 24,
5 characterized in that it consists of means for depositing second raw mix (9) on an underlayer (15) of the first raw mix (8) before clinkering.

26. Installation for manufacture of cement (1) according to any one of Claims 20-25 characterized in that it consists of a first grinding mill (20) of clinkered mixture (7) for the preparation of a ground clinkered mixture (30), a second mixer (29) in which
10 there is added to the ground clinkered mixture (30) milled limestone and/or gypsum and/or milled anhydrite, and possibly heavy metals or oxidation compounds of milled heavy metals.